On the Influence Exercised by the Vibrations of a Crystal Lattice on the Formation of Electron-Hole-Pairs in a Strong Electric Field

thereby be considerably extended. Thus it holds for germanium that $T_D = 360^\circ K$ and the frequencies of optical phonons correspond to the temperature $T_{optical} = \hbar\omega_{optical}/k \sim 500^\circ K$. The final expression for n is explicitly written down. Up to a certain field strength the "multiphonon processes" contribute the main part to the probability of the passage of the valence electron into the conductive zone. This leads to an entirely new dependence of this probability on field strength and on temperature. The considerations discussed also hold good for another mechanism in which the valence electron obtains its energy not from the lattice but from another electron already in the conductive zone. The collisions with the additions in which no energy at all is transferred may exercise influence on the probability of the formation of electron-hole pairs only in the case of very low temperatures. The most promising process for the experimental differentiation of all these mechanisms is obviously the observation of the dependence of the critical

On the Influence Exercised by the Vibrations of a Crystal Lattice on the Formation of Electron-Hole-Pairs in a Strong Electric Field

field strength on the temperature. Finally the author thanks V. L. Ginzburg for his classification of the results obtained. There are 9 references, 5 of which are Soviet.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Institute of Physics im. P. N. Lebedev, AS USSR)

SUBMITTED: November 11, 1957

1. Semiconductors---Vibration

Card 4/4

AUTHOR: Keldysh, L. V. SOV/56-34-5-12/61

TITLE: The Influence of a Strong Electric Field Upon the Optical Characteristics of Nonconductive Crystals (O vliyanii sil'nogo elektricheskogo polya na opticheskiye kharakteristiki neprovodyashchikh kristallov)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 34, Nr 5, pp. 1138 - 1141 (USSR)

ABSTRACT: In this paper the computation of the absorption coefficient of a crystal in a homogeneous field is exposed for such frequencies which in the no-field case are not absorbed at all. As is known a homogeneous field considerably modifies the states of the electrons in a crystal. In general the steady states are, strictly speaking, missing at all. Even in zero-th approximation the electrons are described by functions of the type

$$\psi_j(\vec{p}_o,\vec{r},\vec{t})=\exp\left\{-\frac{i}{\hbar}\int_0^t \varepsilon_j(\vec{p}_o-e\vec{E}x)dx\right\}\psi_j(\vec{p}_o-e\vec{E}t,\vec{r})$$

instead of by Bloch's (Blokh) functions $\psi_j(\vec{p},\vec{r})$. The function $\varepsilon_j(p)$ determines the dependence of the energy of the electron upon the quasi-

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momentum in the zone with the index j. $\vec{E}$ denotes the electric field strength. These functions, except exponentially small terms, are solutions of the time-dependent Schrödinger-(Shredinger)equations. Subsequently the author computes the correction for the wave function of a system which occurs as a consequence of the interaction with light, and it is developed according to the aforementioned functions. This method has, besides its physical clearness the advantage of obviously being complete and orthogonal. A formula for the total probability of the absorption of a photon $\hbar\omega$ per unit time and per unit volume is derived. According to this formula photons of lower frequencies than $\omega_0 = \varepsilon_0/\hbar$ are not absorbed at all. $\varepsilon_0 = \min \left\{ \varepsilon_c(\vec{p}) - \varepsilon_v(\vec{p}) \right\}$ is valid. The absorption coefficient increases as $(\omega - \omega_0)^{1/2}$. The probability of the absorption of quanta with frequencies lower than ω_0 is different from zero. For this case the absorption of the photon must be determined by other ways as in the case described above. The

term found for the probability, is written down explicitly. These computations also can be performed for a more general case that is to say for a lattice with an arbitrary symmetry and with an arbitrary direction of the field, if the motion of the electron in general is aperiodic. In an electric field considerable changes in the frequency dependence of the absorption coefficient occur near the threshold. These changes can, with the known restrictions, be interpreted as a shift of the limit of absorption towards the "red" side. There are 5 references, 2 of which are Soviet.

ASSOCIATION: Fizicheskiy institut im.P.N.Lebedeva Akademii nauk SSSR (Physics Institute imeni P.N.Lebedev, AS USSR)

SUBMITTED: November 1, 1957 (initially), and February 20, 1957 (after revision)

24 (3)

AUTHOR: Keldysh, L. V. SOV/56-37-3-20/62

TITLE: Kinetic Theory of Impact Ionization in Semiconductors

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 3 (9), pp 713-727 (USSR)

ABSTRACT: The present paper is a theoretical investigation of the influence of impact ionization processes on the distribution functions of electrons and holes in a strong electric field. The distribution functions are set up according to Davydov et al (Ref 2). It was found that the energy dependence of the impact ionization probability near the threshold differs considerably for crystals with high and with low dielectric constant. For both cases the solution of the equation of motion is discussed. Further, expressions are derived for the equilibrium number of carriers in a strong field, the impact ionization coefficients, the critical field strength, etc. The dependence of the breakdown field on temperature, sample thickness, and law of interaction between electrons and the lattice is investigated in the following, and so is the interrelation between the expressions obtained with the well-known breakdown criteria of Fröhlich (Ref 6) and Hippel (Ref 9). It is further shown that an increase

of the electric field leads to a decrease of the recombination rate, and that as a result the equilibrium number of carriers begins to increase with increasing field. This effect occurs before impact ionization becomes manifest. In appendix I the probability of formation of electrons and holes with given momenta is discussed as a result of ionization pulses of electrons with given primary momenta; appendix II investigates the system of distribution functions, set up in zeroth approximation, separately for the range of high and relatively low field strengths, and in appendix III a correction to the solution of this system of equations for j = 2 is given. There are 14 references, 6 of which are Soviet.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Institute of Physics imeni P. N. Lebedev of the Academy of Sciences, USSR)

SUBMITTED: March 23, 1959

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24.7700 2407, 1035, 1135

S/020/60/135/006/012/037
B019/B056

AUTHORS: Vul, B. M., Corresponding Member AS USSR, Zavaritskaya, E. I., and Keldysh, L. V.

TITLE: Impurity Conductivity of Germanium at Low Temperatures

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 6, pp. 1361-1363

TEXT: At temperatures $T \ll \varepsilon_i/k$, where ε_i is the impurity ionization energy and k the Boltzmann constant, the electrical conductivity of semiconductors is very low. If the field strength is increased, the impact ionization increases, because the mean free path of the carriers is relatively great at low temperatures. As the impurity ionization energy is low (0.01 ev for the indium-doped p-type germanium considered here), impact ionization starts already at field strengths of some v/cm. The lower the temperature, the lower is the fraction of thermal ionization, as follows from the dependence of current density on field strength shown in Fig. 1. At the temperature of liquid helium, the hole concentration may be

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Impurity Conductivity of Germanium at Low Temperatures

S/020/60/135/006/012/037
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described by: $p = \frac{s(N_a - N_d) - rN_d}{r + s}$ (1), where s is the mean ionization probability, r the mean recombination probability, N_a the acceptor concentration, and A_d the donor concentration. As the increase in r with an increase of electron energy is much slower than that of s, the free hole concentration in the range of pre-breakdown field strength is determined largely by the exponential growth of the ionization rate. The drift rate as a complex function of field strength is discussed, and it is found that at high field strengths the sharp decrease in mobility at helium temperatures is connected with the occurrence of a large quantity of charge centers. Thereby, the fraction of Coulomb scattering in the total number of collisions per unit time increases. The authors thank V. A. Chuyenkov for a discussion. There are 3 figures and 6 references: 3 Soviet and 3 US.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Institute of Physics imeni P. N. Lebedev of the Academy of Sciences USSR)

SUBMITTED: August 31, 1960

Card 2/2

KELDYSH, L. V. (Prof.)

"Tunnelling of Interacting Electrons in Solids."

report presented at the Symposium on Tunnelling Phenomena in Solids, Philadelphia, 30 January 1961.

Lebedev Inst., Acad. Sci. USSR.

KELDYSH, L.V.

Conference on tunnel phenomena in solids. Vest. AN SSSR 31 no.8:95-96 Ag '61. (MIRA 14:8)
(Solids)

39498
S/056/62/043/002/041/053
B125/B102

24.2120

AUTHOR: Keldysh, L. V.

TITLE: Optical properties of electrons with a band energy spectrum in a strong electric field

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 2(8), 1962, 661 - 666

TEXT: The tensor of the dielectric constant of an electron gas in a spatially periodic field in the presence of an additional uniform strong field E can be determined from

$$\Delta\varkappa_{lm}(\mathbf{k},\omega)=4\pi i\frac{eE_0\nabla n}{\omega E_0^2}\int_\Omega\frac{d^3p}{\Omega}v_l(\mathbf{p})\int_{-\infty}^{0}v_m(\mathbf{p}+e\mathbf{E}_0\tau)\exp\left\{i\int_\tau^0[\mathbf{kv}(\mathbf{p}+e\mathbf{E}_0\tau')-\right.$$
$$\left.-\omega-i\nu(\mathbf{p}+e\mathbf{E}_0\tau')]\,d\tau'\right\}d\tau. \qquad (13)$$

The spectrum of the system investigated consists of several equidistant lines with maxima at $\omega_k = k\omega_0$ and with widths of the order of $\bar{\nu}$. The

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Optical properties of electrons...

Doppler broadening of these lines is very small. The general equation

$$\Delta\varkappa_{lm}(\mathbf{k},\omega)= \qquad (14)$$
$$=4\pi i\frac{eE_0\nabla n}{\omega E_0^2}\int_\Omega\frac{d^3p}{\Omega}v_l(\mathbf{p})\,[1-\exp(i[\omega+i\overline{\nu(\mathbf{p})}-\overline{\mathbf{kv}(\mathbf{p})}]T)]^{-1}\int_0^T v_m(\mathbf{p}-e\mathbf{E}_0\tau)\times$$
$$\times\exp\left\{i\int_0^\tau[\mathbf{kv}(\mathbf{p}-e\mathbf{E}_0\tau')-i\nu(\mathbf{p}-e\mathbf{E}_0\tau')-\omega]\,d\tau'\right\}d\tau=4\pi\frac{eE_0\nabla n}{\omega E_0^2}\sum_{k=-\infty}^{\infty}\int_\Omega\frac{d^3p}{\Omega}\times$$
$$\times\int_0^T\frac{d\tau}{T}\frac{v_l(\mathbf{p})v_m(\mathbf{p}-e\mathbf{E}_0\tau)}{\overline{\mathbf{kv}(\mathbf{p})}-i\overline{\nu(\mathbf{p})}-\omega+k\omega_0}\exp\left\{i\int_0^\tau[\mathbf{kv}(\mathbf{p}-e\mathbf{E}_0\tau')-i\nu(\mathbf{p}-e\mathbf{E}_0\tau')-\omega]\,d\tau'\right\},$$

arises from (13) due to the periodicity of the velocity $\vec{v}(\vec{p})$ and of the collision frequency $\nu(\vec{p})$ ($\vec{p}$ being the momentum). This equation can be considerably simplified in the case of strong fields ($\bar{\nu}T\ll 1$), as well as of relatively weak fields ($\bar{\nu}T\gg 1$). The optical properties of the system are strongly anisotropic in strong fields and at low frequencies. Longitudinal plasma oscillations can only be propagated perpendicular to the unperturbed

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KELDYSH, L.V.

Low-lying levels in semiconductors. Zhur. eksp. i teor. fiz. 45 no.2:364-375 Ag '63. (MIRA 16:9)

1. Fizicheskiy institut imeni P.N.Lebedeva AN SSSR.
(Semiconductors) (Quantum electrodynamics)

KELDYSH, L.V.

Low-lying levels in semiconductors. Zhur. eksp. i teor. fiz. 45 no.2:364-375 Ag '63. (MIRA 16:9)

1. Fizicheskiy institut imeni P.N.Lebedeva AN SSSR.
(Semiconductors) (Quantum electrodynamics)

L 10492-63 EWT(1)/EWG(k)/BDS/EEC(b)-2--AFFTC/ASD/ESD-3--Pz-4--AT/IJP(C)

ACCESSION NR: AP3000623 S/0181/63/005/005/1411/1416

AUTHOR: Keldy*sh, L. V.; Kopayev, Yu. V. 65 64

TITLE: Energy spectrum and degenerate semiconductor with ionic lattice

SOURCE: Fizika tverdogo tela, v. 5, no. 5, 1963, 1411-1416

TOPIC TAGS: optical phonon, electron-phonon interaction, ionic-lattice degenerate semiconductor, Fermi-surface electron gas

ABSTRACT: The effect of degenerate-state electron interaction with zero optical lattice phonons on certain characteristics of an electron gas near the Fermi surface is investigated analytically. It is demonstrated that the density of energy states turns to zero near the Fermi level as a result of this interaction, which is observed in experiments on tunnel phenomena in $A^{III}B^{V}$-type compounds and in the frequency dependence of intrinsic absorption near the threshold. An expression for conductivity is presented which indicates the existence of a sharp minimum of conductivity near the Fermi surface. This minimum reaches zero when the energy of the electron equals its Fermi surface value. An explanation is thus furnished for the results of earlier experiments by R. N. Hall and associates with tunnel diodes of $A^{III}B^{V}$

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ACCESSION NR: AP3000623

compounds at low potentials, which showed a pronounced conductivity minimum near the Fermi surface. The potential range within which the minimum appears is proportional to the Frolich interaction constant. The interaction of light with current carriers is analyzed first for the case of a semiconductor in which the valence band holes are degenerate and no carriers are present in the conduction band. It is shown that at a proton energy corresponding to the "red" boundary of absorption the absorption factor within a certain energy range grows from zero to values approaching those in the case of no interaction. The nonequilibrium case, when both the valence and the conduction bands are degenerate, is also analyzed, and expressions are given for the absorption factor and for the radiation factor characterizing the light emission which accompanies the electron transfer occurring from conduction band to valence band under nonequilibrium conditions. Orig. art. has: 34 equations.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR, Moscow (Physics Institute, AN SSSR)

Card 2/3

KELDYSH, L. V.

L. V. Keldysh, "Low Mobility Semiconductors."

report submitted for the Conference on Solid State Theory, held in Moscow, December 2-12, 1963, sponsored by the Soviet Academy of Sciences.

ACCESSION NO: AP4004840 S/0181/63/005/012/3378/3389

AUTHORS: Keldy*sh, L. V.; Proshko, G. P.

TITLE: Infrared absorption in heavily doped Ge

SOURCE: Fizika tverdogo tela, v. 5, no. 12, 1963, 3378-3389

TOPIC TAGS: infrared absorption, germanium, absorption edge, compensated germanium absorption, doped germanium, absorption edge shift, heavily doped germanium, compensated germanium

ABSTRACT: Samples for this study were cut from rods grown from a melt along the [111] direction, and single compensated crystals were obtained by introducing donor impurities into a melt containing acceptor impurities (gallium). The authors measured the absorption in heavily doped compensated Ge. They discovered that the edge of the absorption band is displaced toward the longer wave lengths and that this displacement differs substantially from cross-over and indirect transitions. In the zone of indirect transitions there is also a substantial difference between the shift in As-doped Ge and the shift in Sb-doped Ge. The shift depends not only on concentration but also on the nature of the impurities. In As-doped samples the shift is noted at concentrations on the order of 10^{18} cm^{-3}, and it becomes rapidly

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ACCESSION NO: AP4004840

greater (to ~ 0.05 ev at $n \approx 2 \cdot 10^{19}$ cm^{-3}), then remains practically steady till the maximum concentration is reached ($n \sim 1.5 \cdot 10^{20}$ cm^{-3}). In Sb-doped samples the displacement appears only at concentrations of $\sim 10^{19}$ cm^{-3} or more. The authors have shown that all these results may be qualitatively explained by considering the difference in effective masses of electrons during cross-over and indirect transition and also by considering the difference in efficiency of As and Sb atoms for transmitting the pulse in indirect transition. Changes in thermal width of the forbidden band, when doping is strong, and changes in the optical forbidden band corresponding to different transitions may be completely different. "The authors express their sincere thanks to A. P. Shotov and V. S. Bagayev for discussing the results and for valuable suggestions, to V. I. Fistul' and Ye. P. Rashevskaya for making the chemical and spectral analysis and the reflection measurements, and also to V. I. Magalyas and L. M. Novak for their aid in the work." Orig. art. has: 7 figures, 1 table, and 16 formulas.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR, Moscow (Physical Institute AN SSSR)

SUBMITTED: 27May63 DATE ACQ: 03Jan64 ENCL: 00

SUB CODE: PH NO REF SOV: 002 OTHER: 008

Card 2/2

[illegible], [illegible]; [illegible], [illegible]; [illegible], [illegible]; [illegible], [illegible]; [illegible], L. V.; SHOTOV, A. P.

"About the energy spectrum of heavily doped GaAs."

report submitted to Intl Conf on Semiconductor Physics [Radiative Recombination Symp], Paris, 27-28 Jul 64.

KELDYSH, L.V.

Current problems in the theory of semiconductors. Vest.
AN SSSR 34 no.8:77-83 Ag '64. (MIRA 17:12)

ACCESSION NR: AP4034919 S/0181/64/006/005/1399/1405

AUTHOR: Bagayev, V. S.; Berozashvili, Yu. N.; Vul, B. M.; Zavaritskaya, E. I.; Keldy*sh, L. V.; Shotov, A. P.

TITLE: Energy spectrum of strongly doped gallium arsenide

SOURCE: Fizika tverdogo tela, v. 6, no. 5, 1964, 1399-1405

TOPIC TAGS: gallium arsenide, recombination radiation, p-n junction, GaAs, GaAs p-n junction, semiconductor, band structure

ABSTRACT: The recombination radiation of gallium arsenide has been investigated at relatively low injection levels of charge carriers. The minority carriers were injected into a p-n junction prepared by diffusing zinc into GaAs with an initial Te concentration between 10^{17} and $2 \cdot 10^{18}$ per cm^3. The area of the p-n junction was of the order of 10^{-3} cm^2. Recombination radiation modulated at a frequency of 9 cps was recorded when thermal heating of the samples was negligible. The recombination radiation spectra of samples

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L 6824-65
EWT(1)/EPA(s)-2/EWG(k)/K/EEC(t)/T/EEC(b)-2 Pz-6/Pt-10/P1-4 IJP(c)/ASD(a)-5/
[illegible](m)-2/ESD(t)/RAEM(t) JG/AT
ACCESSION NR: AP4044954 S/0181/64/006/009/2791/2798

AUTHORS: Keldy*sh, L. V.; Kopayev, Yu. V. 80 79

TITLE: Possible instability of the semi-metallic state relative to Coulomb interaction

SOURCE: Fizika tverdogo tela, v. 6, no. 9, 1964, 2791-2798

TOPIC TAGS: electron electron interaction, electron hole interaction, semimetallic state, Coulomb interaction, semiconductor, dielectric, superconductivity, second order phase transition

ABSTRACT: In order to cast light on the possible electron-electron and electron-hole interactions in solids, the authors consider a simple model of a semimetal, containing n electrons in one band and n holes in another. It is shown that the Coulomb interaction leads to an instability of such a state against pairing of the electrons from one band with the holes from the other. As a result, the sys-

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tem acts like a dielectric at low temperatures. However, as in the case of a superconductor, the gap in the excitation spectrum will decrease with increasing temperature, and at a certain critical temperature T_c a second-order phase transition takes place, wherein the gap becomes filled and the system is converted into a semimetal. At low temperatures $T < T_c$ the dielectric has thermodynamic characteristics of a superconductor. The model can be used to explain the transformation of semiconductors into semimetals at high temperatures. It is pointed out, however, that in the latter case the model can only be used for qualitative considerations, and a quantitative analysis calls for an entirely different approach. Orig. art. has: 46 formulas and 2 figures.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR, Moscow (Physics Institute, AN SSSR)

I 6824-65

ACCESSION NR: AP4044954

SUBMITTED: 18Apr64

ENCL: 00

SUB CODE: SS, NP

NR REF SOV: 005

OTHER: 003

Card 3/3

L 21727-65 EWG(k)/EWT(l)/EWA(h)/T Pz-6 IJP(c)/ASD(a)-5/AFWL/BSD/SSD(b)/.
SSD/ASD(p)-3/AFETR/ESD(gs)/ESD(t) AT
ACCESSION NR: AP4044578 S/0030/64/000/008/0077/0083

AUTHOR: Keldysh, L. V.

TITLE: Current questions on the theory of semiconductors 21

SOURCE: AN SSSR. Vestnik, no. 8, 1964, 77-83

TOPIC TAGS: semiconductor, plasma oscillation, semimetal, band structure

ABSTRACT: This paper is a summary of current aspects of semiconductor theory. The author considers a fundamental point: how, and under what conditions, one type of spectrum may change into another, such as how a semiconductor may be converted to a metal, and vice versa. He points out the two fundamental factors: mutual position of atoms in the lattice (lattice symmetry), and interaction of electrons and holes. In considering a possible semimetal model, it may be assumed that band structure is present. If Coulomb interaction is considered, the bands change markedly. The base of each is cut off, and these join to form a new band. New bands thus forming repel each other. The lower band is full, the upper empty, and the result is a dielectric or a semiconductor. The semimetallic state is seen to be unstable relative to Coulomb interaction. Experimental data show that at rather high temperatures all typical semiconductors actually change to the metallic

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state, the transition temperature generally coinciding with the melting point. In good semiconductors with a narrow forbidden band, there is actually a tendency for this band to diminish with rise in temperature and to change subsequently to the semimetal state. The wider the forbidden band, the higher the temperature of transition. Another type of transition of semiconductor to metal may take place at ordinary temperatures and pressures; this is associated with magnetic transformations. Oxide semiconductors, at some critical Néel temperature (about 100K), lose their antiferromagnetic properties, and some of them become true metals (Ti, V and Fe oxides). Plasma phenomena represent another aspect of semiconductors of considerable importance for modern theory. At large impurity concentrations Boltzmann statistics no longer apply, and Fermi-Dirac statistics must be used. It may be shown that the passage of ultrasonic waves, strong currents, and beams of fast electrons through a plasma causes a buildup of plasma oscillation. Consideration of plasma phenomena has fundamentally altered the theories of current passage through a semiconductor. These phenomena may also prove to be of wide application in producing various kinds of waves and vibrations. Orig. art. has: 4 figures and 2 formulas.

ASSOCIATION: none

L 21727-65
ACCESSION NR: AP6004578

SUBMITTED: 00 ENCL: 0

SUB CODE: EC NO REF SOV: 000 OTHER: 000

Card 3/3

L 14829-65 EWT(l)/EWT(m) AEDC(a)/AFWL/SSD JD/JW

ACCESSION NR: AP4047919 S/0056/64/047/004/1515/1527

AUTHOR: Keldy*sh, L. V.

TITLE: A diagram technique for non-equilibrium processes

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47, no. 4, 1964, 1515-1527

TOPIC TAGS: Green function, quantum statistics, kinetic theory, equilibrium condition

ABSTRACT: A diagram technique analogous to the usual Feynman technique in field theory is developed for calculating Green's functions for particles in a statistical system which deviates to an arbitrary extent from the state of thermodynamic equilibrium under the action of an external field. It is found that in order to describe such a system it is necessary to introduce two Green's functions for each type of particle. A system of equations is derived for the Green's

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functions of the particles in the system, and it is shown that one of these two equations is essentially analogous to the kinetic equation. The appearance of such an equation on top of the equations for systems and thermodynamic equilibrium is quite natural in this problem, since an equation is needed to describe the distribution of the particles in the system. In the equilibrium case this is given by the Gibbs canonical distribution. The diagram technique used here is similar to the Mills technique (Preprint, 1962) for the calculation of time-dependent quantities (kinetic coefficients) in equilibrium systems. This technique has the advantage that is completely analogous to the Feynman technique, except that it uses a larger number of Green's functions. The function needed to describe the distribution of the particles in the system appears automatically, and the equation for this function plays the role of the kinetic equation. "In conclusion I thank V. L. Gurevich, I. Ye. Dzyaloshinskiy, D. A. Kirzhnits, and Ye. S. Fradkin for a discussion of many problems touched upon in this article. Orig. art. has: 79 formulas.

L 14829-65
ACCESSION NR: AP4047919

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences SSSR)

SUBMITTED: 23Apr64 ENCL: 00

SUB CODE: GP NR REF SOV: 008 OTHER: 012

Card 3/3

L 16890-65 EWG(j)/EWA(k)/FBD/EWT(l)/EEC(k)-2/EEC(t)/T/EEC(b)-2/EWP(k)/EWA(m)-2/EWA(h)
Pn-4/Fo-4/Pf-4/Peb/P1-4/P1-4 IJP(c)/SSD/SSD(c)/SSD(a)/AFWL/ASM(p)-2/ASD(a)-5/
AEDC(a)/BSD/AFETR/RAEM(a)/AFTC(p)/ESD(ge)/ESD(t) WG
ACCESSION NR: AP5000355 S/0056/64/047/005/1945/1957

AUTHOR: Keldy*sh, L. V.

TITLE: Ionization in the field of a strong electromagnetic wave

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47, no. 5, 1964, 1945-1957

TOPIC TAGS: laser, ionization, laser beam ionization effect, condensed media ionization, light beam ionization effect

ABSTRACT: The analytical investigation of this problem was prompted by works of Dammon and Tomlinson (Appl. Opt. 2, 1963, 546) and Meyerhand and Haught (Phys. Rev. Lett. 11, 1963, 401) which reported on the electrical breakdown in gases in the focus of a laser beam. In this connection, the probability of tunnelling at infrared and light frequencies becomes important as the mechanism for absorption of powerful radiation within the frequency range below the ionization potential. The expressions obtained in this work for the ionization probability of atoms in strong electromagnetic wave fields take the form of known formulas describing tunnelling autoionization at limit

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low frequencies, while at high frequencies they indicate the simultaneous absorption of several photons. The analysis is first applied to the hydrogen atom and the direct transition of the electron from the ground level to the free state, disregarding the Coulomb field in the first approach. Then, the case of a two-step transition via an excited level to the free state is considered. The final step of the analysis deals with the ionization in crystals. It is shown that in crystals as well as in gas, the ionization probability for low frequencies and strong fields is described by the formula for the tunnelling effect, while in the opposite case, a multiquantum absorption phenomenon ensues. Due to the intermediate transition of the atom to an excited state, a number of resonance maxima of the ionization probability occur, the positions and widths of which depend on the field strength of the wave. The ionization cross section near such a maximum increases by several orders of magnitude. The described mechanism of direct ionization by the wave field may be of value, under certain conditions, in cases of electric breakdown in gases, especially in condensed media where much higher breakdown fields and lower ionization potentials are required. Orig. art. has: 45 formulas.

L 16890-65
ACCESSION NR: AP5000355

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences SSSR)

SUBMITTED: 23May64	ENCL: 00	SUB CODE: EM
NO REF SOV: 003	OTHER: 005	ATD PRESS: 3150

Card 3/3

KELDYSH, L.V.

Superconductivity in nonmetallic systems. [illegible] (MIRA 18:6)
no.243-7-333 Je '65.

L 11389-66 APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000721420016-8"
ACC NR: AP7000399 SOURCE CODE: UR/0386/66/004/009/0364/0368

AUTHOR: Bagayev, V. S.; Berozashvili, Yu. N.; Keldysh, L. V. 41

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Electrooptical effect in GaAs

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 4, no. 9, 1966, 364-368

TOPIC TAGS: gallium arsenide, electrooptic effect, absorption edge, double refraction, dielectric constant, refractive index

ABSTRACT: The authors have investigated the change in the refractive index n in homogeneous semi-insulating GaAs placed in an external electrostatic field, and observed also the shift of the absorption-band edge. To determine the change in the refractive index, monochromatic light modulated at 1 kHz was passed through the GaAs sample. The signal from the light receiver was amplified with a narrow-band amplifier and then fed to an automatic plotter through a synchronous detector. The cryostat with the sample was placed between two polarid films. When no field was applied to the sample and the polaroids were crossed, the recorded signal was practically equal to zero. Application of the field produced birefringence in the sample. The linearly polarized light thus became elliptically polarized after passing through the sample. The measurements yielded the dependence of the phase difference $\delta\varphi$ on the intensity E of the external

Card 1/2

KELDYSH, M.

Science, practice, communist building-up. Izobr.i rats. no.1:1-3 '64. (MIRA 17:4)

1. Prezident AN SSSR.

L 25694-65 EEO-2/EWG(j)/EWT(d)/FSF(h)/FSS-2/EWG(r)/EWT(l)/FS(v)-3/EEC(k)-2/EEC(f)/EWG(v)/EWA(d)/EEC-4/EEC(t)/EWG(a)/EEC(c)-2/EWG(c) Pe-5/Pi-4/Pn-4/Po-4/Pd-4/Pq-4/Pac-4/Pae-2 TT/AST/JKT/DD/RD/GW

ACCESSION NR: AP5001807 S/0209/64/000/012/0024/0026

AUTHOR: Keldysh, M. (President AN SSSR, Academician)

TITLE: A new stage in the conquest of outer space: The world's first collective flight of astronauts

SOURCE: Aviatsiya i kosmonavtika, no. 12, 1964, 24-26

TOPIC TAGS: manned satellite, satellite landing, satellite observation, space medicine, Vostok series, Voskhod series, satellite communication

ABSTRACT: The author, President of the Academy of Sciences of the SSSR, discusses in general terms the progress made by the Soviet Union in the area of space science and, particularly, in the field of manned satellites. Particular attention is called to the difficulties which were encountered in the design of systems which would provide for the safe and reliable return of the capsule to Earth (ballistic descent, retro-rocket triggering, capsule hull configuration and atmospheric shielding, etc.). The medical-biological phase of this preparatory stage is also briefly mentioned. The role of the "Vostok"-series of spacecraft with orbital height of 200-400 km and with provision for return to the surface of the

Card 1/3

L 25694-65
ACCESSION NR: AP5001807

3

Earth through atmospheric drag is considered as a logical preliminary step preceding the launching, on 12 October 1964, of the 3-man "Voskhod" vehicle with its crew of specially hand-picked specialists (scientist, engineer and medic). The more evident differences between a single-man space-flight program and that which can be performed by a crew consisting of several individuals, all highly trained and operating on the basis of a considerably enlarged plan of scheduled observations, are concisely mentioned. The author states that, although the flight was planned for a single 24-hour period, the ship had a flight capability for a far longer time. Certain of the more interesting optical observations (polar lights, horizon lighting, illuminated dust particles, etc.) and medical tests (respiration, cardiovascular activity, etc.) are briefly touched upon. The author foresees a broad-based cooperation of many nations, large and small, in the development of manned spaceships as a means of communication, in addition to their use for space exploration. Without going into any details, the statement is made that the rocket-booster which orbited the "Voskhod" is the most powerful in the world and that the next flight in this series will take place when all necessary preparations have been made.

ASSOCIATION: AN SSSR

SUBMITTED: 00 ENCL: 00 SUB CODE: SV

Card 2/3

KELDYSH, M., akademik

World's first joint flight of astronauts. Av. i Kosm. 47 no.12: 21-26 D '64 (MIRA 18:1)

1. Prezident AN SSSR.

KELDYSH, M.V., and LAVRENT'YEV, M.A.

"K Teorii Kolblyushchegosya Kryla," Tekhnicheskiye Zametki, TsAGI, No. 45, 1939.

KELDYSH, M.V.

Nekotorye obschchie svoistva poliplanov. Moskva, 1936. 6 p. (TSAGI. Trudy, no. 261)

Summary in English.

Title tr.: Some general properties of multiplanes.

QA911.M65 no. 261

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

Keldysh M.V.

KELDYSH, M. V., and L. I. SEDOV.

Teoriia volnovogo sopротivieniia v kanale konechnoi glubiny. (In: Konferetsiia po teorii volnovogo soprotivleniia. Moscow, 1936. Trudy, p. 143-151)

Summary in English.

Title tr.: Theory of wave resistance in a channel of finite depth.

TL505.K6 1936

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955

KELDYSH, V.V., and M.A. LAVRENT'EV

O dvizhenii kryla pod poverkhnost'iu tiazheloi zhidkosti. (In: Konferentsiia po teorii volnovogo soprotivleniia. Moscow, 1937. Trudy, p.21-64, diagrs.)

Summary in English.

Title tr.: Motion of an airfoil below the surface of a heavy fluid.

TL505.K6 1936

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955

Keldysh M.V.

GROSSMAN, E.P., M.V.KELDYSH and IA.M.PARKHOMOVSKII

Vibratsii kryla s eleronom. Moskva, 1937.

Bibliography: p.98

Title tr.: Vibration of a wing with an aileron.

QA911.M65 no.337

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955

KELDYSH, M.V.

Vibratsii v vozdushnom potoke kryla s podkosami. Moskva, 1938. 40 p., illus., diagrs. (TSAGI. Trudy, no. 357)

Title tr.: Vibrations of a braced wing in air flow.

QA911.M65 no. 357

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

KELDYSH, M. V.

Rabota nakhoditsya v pechati.

Sur les suites de polynom s bornes dans leur ensemble. Matem. SB., 42 (1935), 719-724.

O teoreme Liuvillya dlya subgarmonicheskikh funktsiy. Matem, SB., 2 (44), (1937), 369-378.

O razreshimosti i ustoychivosti zadachi dirikhle. Dan, 18 (1938), 315-318.

Konformnyye otobrazheniya mnogosvyaznykh oblastey na kanonicheskiye oblasti. Uspekhi matem. Nauk, 6 (1939), 90-119.

Sur l'approkhimation en moyenne quadratique les fonctions analytiqu s. Matem. SB., 5 (47), (1939), 391-402.

Sur l'approkhimation des fonctions analytiques dans les domaines fermes matem. SB., 8 (50), (1940), 137-148.

O zamknutosti ortogonal'nykh s vesom cistem polinomov. Dan, 30 (1941), 771-773.

O predstavlenii funktsii kompleksnogo peremennogo ryadami polinomov v zamknutykh oblastya kh. Matem. SB., 16 (581), (1945), 249-258.

Sur l' approximation en moyenne par polynomes des fonctions d'une variable complexe. Matem. SB., 14 (58), (1945), 1-20.

Sur les suites des polynomes harmoniques. C. R. Acad. Sci., 202 (1936), 1149-1157.

Ob ustoychivosti resheniya zadachi dirikhle. IAN, ser. Matem. (1937), 551-593.

Sur le probleme de dirichlet. C. R. Acad. Sci., 204 (1937), 1783-1790.

O edinstvennosti zadachi neymana DAN, 16 (1937), 151-152.

Sur la representation conforme des domaines limites par des courbes rectifiables.

Sur la suite convergente des polynomes harmoniques. Tbilisi, Trudy Matem, in-ta gr. fil. AN, 1 (1937), 165-184.

Ob odnoy zadache karlemana. Dan, 23 (1939), 746-748

(cont.)

KELDYSH, M. V. (Cont.)

Otsenki dlya otnositel'noy garmonicheskoy mery. Pril. K Kn. R. nevanlinna "odnoznachnyye analiticheskiye funktsii". M., GITI (1941), 375-379.

O razreshimosti i ustoychivosti zadachi dirikhle. DAN, 18 (1938), 315-318.

O zadache dirikhle. Dan, 32 (1941), 308-309.

O razreshimosti i ustoychivosti zadachi. Dirilhle. Uspekhi matem. Nauk, 8 (1941), 171-231.

O metode B. G. Galerkina dlya resheniya krayevykh zadach. IAN' Ser. Matem., 6 (1942), 309-330.

O metode B. G. Galerkina dlya resheniya kraevykh zadach. IAN, Ser. Matem., 6 (1942). 309-330.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

[illegible],

"Con[illegible]ns for a [illegible] of Right Angled [illegible] [illegible] Closed," Dok. AN 30, No. [illegible], 1941. [illegible] Sci. c1941-.

"Concern[illegible]ng and Evaluation of Gr[illegible]n's Function," Dok. A., 24, No. ?, 1939. Steklov Inst. of [illegible]th., Acad. Sci., c1939-.

"On the Approximation of Holomorphic Functions by Entire [illegible]," Dok. AN, 4[illegible], No. 4, 1945. Cor. Mbr. [illegible] Inst. [illegible] Steklov. Acad. Sci.-USSR. c1945-.

"On a Problem of [illegible]. Carleman," Dok. AN.,23, No. [illegible], 1939. [illegible] of Steklov, Acad. Sci. c1939-.

KELDYSH, M.V., E.P. GROSSMAN, and N.I. KARIN.

Vibratsii na samolete. Moskva, TSAGI, 1942.

Title tr.: Aircraft vibrations.

NCF

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

KELDYSH, M.

PA 8T26

Feb 1947

USSR/Mathematics
Mathematical functions

"On the Interpolation of the Integral Functions," I. Ibraghimoff, M. Keldych, 8 pp

"Matemati Sbor" Vol XX, No 2

Demonstration that for any number θ, where $0 < \theta < \frac{1}{2}$, we can indicate a constant $C(\theta)$ such that the inequality $n(\theta r) \; C(\theta) \log M(r)$ produces the uniform convergence of Newton's series of interpolation toward the function $f(z)$.

8T26

Sci. Res. Inst. #1, Sci. Res. Sec., Guided Weapons Exptl. Directorate, Min. Armaments, Noginsk.

Moscow State U.

KEKDYSH, M. V.

PA 187T60

USSR/Mathematics - Mathematician Mar/Apr 51

"Nikolay Ivanovich Muskhelishvili, on the Occasion of his 60th Birthday," M. V. Kekdysh, S. L. Sobolev

"Uspekh Matemat Nauk" Vol VI, No 2, pp 185-190

Born 16 Feb 1891 in Tbilisi (Tiflis) son of military engineer; in 1909 attended Physicomath School, Petersburg U; in 1914 became professor; 1915 - 1920 taught higher math and mech in various colleges in Petersburg; in 1920 returned to Tbilisi to teach in the university there and the Polytech Inst; in 1941 awarded Stalin 1st prize for "Some Problems of the Mathematical Theory of Elasticity"; in 1946 received

187T60

USSR/Mathematics - Mathematician (Contd) Mar/Apr 51

another Stalin prize for "Singular Integral Equations"; in 1950 chosen 3d time as deputy of Upper Soviet USSR. He specialized in theory of functions of complex variable.

187T60

"Continuous Reflections Exceeding in Dimensionality," Usp. Mat. Nauk Vol.6 No. 4 (44), pp 193-220, 1951.

U-1635, 16 Jan 52

KELDYSH M.V.

[illegible] V. On a Tauberian theorem. Trudy Mat [illegible] v 38 pp 77 86 Izdat Akad N [illegible] Moscow 1951 Russian 20 refs

[illegible] owing result is given If $\lim_{x\to\infty}[f(x)/g(x)]=1$ with $f(x)=\int_0^x(t-x)^{-m-1}d\phi(t)$, $g(x)=\int_0^x(t-x)^{-m-1}d\psi(t)$, then $\lim_{x\to\infty}[\phi(x)/\psi(x)]=1$ It is assumed that $\phi(x)$, $\psi(x)$ are positive and increasing, that $\alpha\phi(x)<\psi(x)<\beta\phi(x)$ [illegible] $m=[\beta]$ The proof depends on the [illegible]

[illegible] al Reviews.

KELDYSH M. V.

USSR/Mathematics - Academy of Sciences Jan/Feb 51

"Mikhail Alekseyev Lavrent'yev: His 50th Birthday," M. V. Keldysh

"Iz Ak Nauk SSSR, Ser Matemat" Vol XV, No 1, pp 3-8

Lists 79 works, 1924 - 1950, of Acad Lavrent'yev, one of most active mathematicians in Math Inst imeni V. A. Steklov, Acad Sci USSR. He is member of Acad Sci Ukrainian SSR and Acad Arty Sci. Has been vice president of Acad Sci

170T50

USSR/Mathematics - Academy of Sciences (Contd) Jan/Feb 51

Ukrainian SSR for number of years. He specialises in real functions, differential equations, calculus of variations, and functions of complex variables.

170T50

KELDYSH, M. V.

Source: Mathematical Reviews, Vol 12 No. 10

KELDYSH M V

Keldyš, M. V. On ... cases of degeneration of equations of elliptic type ... boundary of a domain. Doklady Akad. Nauk SSSR ... 77 ... (Russian)

... analytic functions of their real variables, $c \leq 0$. Set $L[u] = y^m u_{xx} + u_{yy} + au_x + bu_y + cu$. Let Δ be a simply connected domain bounded by the segment (0, 1) of the *x*-axis and a smooth curve Γ situated in the upper half-plane. Two problems are considered for the equation ... $L(u)=0$ in Δ. (D): u must assume ... given continuous values on the whole boundary of Δ. (E): u must assume given continuous values on Γ and be bounded in Δ. The following theorem is proved. (D) is uniquely solvable if $m < 1$, or $m = 1$ and $a(x, 0) < 1$, or $1 < m < 2$ and $a(x, 0) \leq 0$, or $m \geq 2$ and $a(x, 0) < 0$. (E) is uniquely solvable if $m = 1$, $a(x, 0) \geq 1$, or $1 < m < 2$ and $a(x, 0) > 0$, or $m \geq 2$ and $a(x, 0) \geq 0$.

L. Bers (Los Angeles, Calif.)

Source: Mathematical Reviews, Vol ...

LEVITAN, B.M.; KELDYSH, M.V., akademik.

One particular Tauberian theorem. Izv.AN SSSR 17 no.3:269-284 My-Je '53. (MLRA 6:5)

1. Akademiya Nauk SSSR (for Keldysh). (Differential equations, Partial) (Integrals)

KELDYSH, M.V.

YEVGRAFOV, M.A.; KELDYSH, M.V., akademik.

Completeness of systems of analytic functions, close to $\{z^n P(z)\}$, $\{[\varphi(z)]^n\}$, and certain interpolation problems. Izv.AN SSSR Ser.mat. 17 no.5:421-460 S-O '53. (MLRA 6:10)

1. Akademiya nauk SSSR (for Keldysh).
(Functions, Analytic) (Interpolation)

KAPILEVICH, M.B.; KELDYSH, M.V., akademik.

Principal solutions for an equation of the hyperbolic type. Dokl.AN SSSR 91 no.4:719-722 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Keldysh).
(Differential equations)

POPOVA, N.V.; KELDYSH, M.V., akademik.

Integrals of a certain differential equation, mapping a semiplane onto a region bounded by segments of straight lines. Dokl.AN SSSR 91 no.4: 727-728 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Keldysh). 2. Belorusskiy politekhnicheskiy institut im. I.V.Stalina (for Popova).
(Differential equations) (Surfaces, Representation of)

SLOBODYANSKIY, M.G.; KELDYSH, M.V., akademik.

Transformation of the minimum problem of the functional, to the problem of the maximum. Dokl.AN SSSR 91 no.4:733-736 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Keldysh).
(Functional analysis)

RAUSHENBAKH, B.V.; KELDYSH, M.V., akademik,

On one of Relei's remarks connected with the thermic excitation of sounds. Dokl.AN SSSR 91 no.4:749-752 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Keldysh).
(Sound waves)

MERGELYAN, S.N.; KELBYSH, M.V., akademik.

Speed of approximation of functions, by polynomials, on arbitrary continua. Dokl.AN SSSR 91 no.6:1271-1274 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Kelbysh). 2. Sektor matematiki Akademii nauk Armyanskoy SSR. (Functions) (Polynomials)

ROZHANSKAYA, N.N.; KELDYSH, M.V., akademik.

Point character of the spectrum of a certain class of matrixes in an analytic space. Dokl.AN SSSR 92 no.1:7-10 S '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Keldysh). (Matrixes)

GEL'FAND, I.M.; GRAYEV, M.I.; KELDYSH, M.V., akademik.

One general method for the expansion of a regular representation of a Lie group into irreducible representations. Dokl.AN SSSR 92 no.2:221-224 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Keldysh). (Groups, Theory of)

GEL'FAND, I.M.; GRAYEV, M.I.; KELDYSH, M.V., akademik.

Analogue of the Plancherelle formula for real, semi-simple Lie groups. Dokl. AN SSSR 92 no.3:461-464 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Keldysh). (Groups, Theory of)

POSTNIKOV, A.G.; KELDYSH, M.V., akademik.

Tauberian theorem for Dirichlet series. Dokl.AN SSSR 92 no.3:487-490 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Keldysh). 2. Matematicheskiy institut Akademii nauk SSSR (for Postnikov). (Series, Dirichlet's)

KELDYSH, M.V.

Keldyš, M. V. On series of rational fractions. Doklady Akad. Nauk SSSR (N.S.) 94, 377-380 (1954). (Russian). 62

If $\sum|A_n|<\infty$ and the function $f(z)=\sum A_n/(z-h_n)$ is meromorphic of finite order in the whole plane then (Nevanlinna's notation), as r tends to ∞, $\limsup N(r,a)/T(r)=1$ for all $a\neq 0$. If $\sum A_n\neq 0$, this result holds for $a=0$ also. The proof depends on various approximations for the Nevanlinna characteristics of $\sum A_n/(z-h_n)$. *A. J. Macintyre.*

KELDYSH, M. V. (Acad.); LYAPUNOV, A. A. (Dr. F. M. S.); SHURA-BURA, M. R. (Dr. F.M.S.)

"Mathematical Problems of Machine Computation,"

paper read at the Session of the Acad. Sci. USSR, on Scientific Problems of Automatic Production, 15-20 October 1956.
Avtomatika i telemekhanika, No. 2, p. 182-192, 1957

9015229

KELDYSH, M.V., akademik; LYAPUNOV, A.A., doktor fiziko-matematicheskikh nauk; SHURA-BURA, M.R., doktor fiziko-matematicheskikh nauk.

Mathematical problems in the theory of calculating machines. Vest.AN SSSR 26 no.11:16-37 N '56. (MLRA 9:12)
(Electronic calculating machines)

SOV/112-58-2-2658

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1958, Nr 2, p 137 (USSR)

AUTHOR: Keldysh, M. V., Lyapunov, A. A., and Shura-Bura, M. R.

TITLE: Mathematical Problems of the Theory of Computers
(Matematicheskiye voprosy teorii schetnykh mashin)

PERIODICAL: V sb.: Sessiya AN SSSR po nauchn. probl. abtomatiz proiz-va, 1956. Plenarn. zasedaniya. M., AS USSR, 1957, pp 100-130, discussion pp 148-161

ABSTRACT: The mathematical, logical, and technical principles of electronic computers can be used in creating new automatic devices, the functioning of which can be specified by a definite sequence of logical or arithmetical operations. From this standpoint, principles of digital and analog computers are set forth, as well as the mathematical bases of their functioning. Methods for automatically realizing a number of algorithm-forming processes are considered: mathematical-problem programming, interlingual translation, data processing, production-process control, dispatcher control, etc. Some

Card 1/2

SOV/112-58-2-2658

Mathematical Problems of the Theory of Computers

cybernetics problems are examined, cybernetics being defined as the science of the creation and structural analysis of algorithms that depict surrounding phenomena and the science that describes the algorithms.

M. Ya. G.

Card 2/2

42-6-15/17

AUTHOR: ALEKSANDROV,P.S., VEKUA,I.N., KELDYSH,M.V., LAVRENT'YEV, M.A.

TITLE: Vladimir Ivanovich Smirnov (to his 70th Birthday) (Vladimir Ivanovich Smirnov (k semidesyatiletiyu so dnya rozhdeniya)

PERIODICAL: Uspekhi Matematicheskikh Nauk, 1957, Vol.12,Nr.6,pp.197-205 (USSR)

ABSTRACT: This is a short biography of V.I.Smirnov with an appreciation of his mathematical and pedagogical merits. A complete list of his publications with 109 numbers and a photo of the celebrator of the jubilee are given.

AVAILABLE: Library of Congress

Card 1/1

KELDYSH, M.V., akademik

Greatest achievement of Soviet science. Vest. Vozd. Fl. no.9: 53-54 S '61. (MIRA 14:11)

1. President AN SSSR.

(Astronautics)

KELDISH, M.V. akad.

Soviet science and the construction of communism. Spisanie BAN 6 no.3:8-39 '61.

1. Predsedatel na Akademiiata na naukite na SSSR.

ALIKHANOV, F.N.; ARUSHANOV, N.A.; AKHUNDOV, V.Yu.; AFIZADE, F.A.; AZIZBEKOV, Sh.A.; BAGIROV, M.A.; VEZIROV, S.A.; VOLOBUYEV, V.R.; GARILOV, F.M.; GADZHIYEV, N.M.; GUSEYNOV, D.M.; GUSEYNOV, I.A.; DADASHEV, R.K.; DADASHZADE, M.A.; DALIN, M.A.; ISKENDEROV, M.A.; KAZIYEV, M.A.; KARAYEV, A.I.; KASHKAY, M.S.; KEL'DYSH, M.V.; KERIMOV, A.G.; LEMBERANSKIY, A.D.; MAMEDOV, G.K.; MEKHTIYEV, M.R.; MIRZOYEV, S.A.; NAGIYEV, M.F.; NESRULLAYEV, N.I.; ORUDZHEV, A.I.; RADZHABOV, R.A.; RUDNEV, K.N.; SADYKHOV, R.N.; SEMENOV, N.N.; TOPCHIYEV, A.V.; TOPCHIBASHEV, M.A.; TAIROVA, T.A.; KHALILOV, Z.I.; EFENDIYEV, G.Kh.; SHUFYUROVA, Z.Z.

IUsif Geidarovich Mamedaliev; obituary. Dokl. AN Azerb. SSR 17 no.12:1123-1126 '61. (MIRA 15:2)
(Mamedaliev, Iusif Geidarovich, 1905-1961)

S/030/61/000/006/003/014
B101/B206

AUTHOR: M. V. Keldysh, President of the Academy of Sciences USSR

TITLE: The beginning of the cosmic era

PERIODICAL: Akademiya nauk SSSR. Vestnik, no. 6, 1961, 16-18

TEXT: This lecture was delivered on the occasion of the cosmic flight by Yu. A. Gagarin on the satellite "Vostok" carried out on April 12, 1961 and lasting 108 min. A short review of the achievements of the USSR in opening up the cosmic space is given: October 4, 1957, first satellite, November 1957, May 1958 subsequent satellites; 1959 a cosmic rocket becoming a satellite of the sun; a moon rocket; a rocket flew round the far side of the moon. Keldysh points to the precision required to bring the rockets on the calculated trajectory. The cosmic rocket to the Venus started on February 12, 1961. The start was made from a satellite. The following discoveries are mentioned: outer radiation belt of the earth reaching 70,000-100,000 km into the cosmos. Its extensions are approaching the earth to 200-300km. Determination of the intensity of cosmic radiation up to a distance of 300 km from the earth's surface; discovery of the anomaly over

Card 1/2

S/030/61/000/006/003/014
B101/B206

the South Atlantic; new knowledge on the atmosphere of the earth, its hydrogen corona; study of the concentration of charged particles up to heights of 20,000 km; data on the density of matter in interplanetary space; recording of charged particles emitted by the sun; data on the composition of primary cosmic radiation and shortwave radiation of the sun. Preliminary experiments with animals are mentioned. Gagarin's achievement is praised as a triumph of Communism.

Card 2/2

KELDYSH, M.V.; PALLADIN, A.V.; KUPREVICH, V.F.; ABDULLAYEV, Kh.M.; SATPAYEV, K.I.; MUSKHELISHVILI, N.I.; MAMEDALIYEV, Yu.G.; MATULIS, Yu.Yu.; GROSUL, Ya.S.; PLAUDE, K.K.; KARAKEYEV, K.K.; UMAROV, S.U.; AMBARTSUMYAN, V.A.; BATYROV, Sh.B.; EYKHFEL'D, I.G. [Eichfeld, J.]

Comments by presidents. Nauka i zhizn' 28 no.10:2-17 O '61. (MIRA 15:1)

1. Prezident Akademii nauk SSSR (for Keldysh). 2. Prezident Akademii nauk Ukrainskoy SSR (for Palladin). 3. Prezident Akademii nauk Belorusskoy SSR (for Kuprevich). 4. Prezident Akademii nauk Uzbekskoy SSR (for Abdullayev). 5. Prezident Akademii nauk Kazakhskoy SSR (for Satpayev). 6. Prezident Akademii nauk Gruzinskoy SSR (for Muskhelishvili). 7. Prezident Akademii nauk Azerbaydzhanskoy SSR (for Mamedaliyev). 8. Prezident Akademii nauk Litovksoy SSR (for Matulis). 9. Prezident Akademii nauk Moldavskoy SSR (for Grosul). 10. Prezident Akademii nauk Latviyskoy SSR (for Plaude). 11. Prezident Akademii nauk Kirgizskoy SSR (for Karakeyev). 12. Prezident Akademii nauk Tadzhikskoy SSR (for Umarov). 13. Prezident Akademii nauk Armyanskoy SSR (for Ambartsumyan). 14. Prezident Akademii nauk Turkmenskoy SSR (for Batyrov). 15. Prezident Akademii nauk Estonskoy SSR (for Eykhfel'd).

(Russia--Economic conditions) (Research)

S/030/61/000/007/001/003
B105/B206

AUTHOR: Keldysh, M. V., Academician, President

TITLE: Soviet science and the structure of Communism

PERIODICAL: Akademiya nauk SSSR. Vestnik, no. 7, 1961, 14-39

TEXT: This is a report by the President of the Akademiya nauk SSSR (Academy of Sciences USSR), Academician M. V. Keldysh, on the reorganization of activities of scientific institutions in connection with the resolution of the TsK KPSS as well as the Sovet Ministrov SSSR (Council of Ministers USSR) on "Measures for improving coordination of scientific research in the country and the activity of the AS USSR". The reporter deals with the following subjects: (1) Development of science in the USSR, which was also paid great attention to by V. I. Lenin. In 1960, over 354,000 scientists worked in the country, among them about 11,000 doctors and more than 98,000 candidates of sciences. There are about 3800 scientific institutions in the Soviet Union, among them about 1500 scientific research institutes. Academician I. M. Gubkin is mentioned in connection with the petroleum deposit "Vtoroye Baku", Academician

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P. P. Lazarev in connection with the exploration of the Kursk Magnetic Anomaly, and Academician Fersman in connection with the Kol'skiy poluostrov (Kola peninsula). Also mentioned are: Academician I. V. Kurchatov in connection with establishing the nuclear industry of the Soviet Union; Academician A. F. Ioffe in the field of semiconductor physics; Academician L. I. Mandel'shtam, N. D. Papaleksi, and A. A. Andronov in the field of the theory of nonlinear oscillations; N. Ye. Zhukovskiy and S. A. Chaplygin in the field of aeronautics; Academician S. V. Lebedev in connection with the synthesis of rubber; Timiryazev, Pavlov, and Michurin in the field of biology. Yuriy Alekseyevich Gagarin and K. E. Tsiolkovskiy are mentioned as pioneers of cosmic flight. (2) Problems of the organization of scientific studies. Problems concerning further advance of science and liquidation of shortcomings are referred to, and the newly established Gosudarstvennyy komitet Soveta Ministrov SSSR po koordinatsii nauchno-issledovatel'skikh rabot i vsekh uchenykh strany (State Committee of the Council of Ministers USSR for the Coordination of Scientific Research and All Scientists of the Country) is mentioned in this connection. The following shortcomings are enumerated among others: introduction of apparatus into practice was delayed although they had been

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elaborated by the Institut avtomatiki i telemekhaniki (Institute of Automation and Telemechanics) in 1950; introduction of "ЭНаНТ" ("Enant") polymers, elaborated by the Institut elementoorganicheskikh soyedineniy (Institute of Elemental-organic Compounds), was delayed for more than 10 years. Studies in the field of cybernetics and economics are also described as being insufficient. The following subjects are also mentioned: (3) Planning and coordination; (4) scientific work at the VUZ (Schools of higher education) and cader training. A closer link between the Academy of Sciences, the Moskovskiy universitet (Moscow University), and Leningradskiy universitet (Leningrad University) is demanded, and the practical experience of the Moskovskiy fizikotekhnicheskiy institut (Moscow Physico-technical Institute) is pointed out; (5) essential problems of science; (6) energetics, nuclear physics; (7) machine building, mechanics, thermophysics; (8) automation, theory of control and coordination; (9) radioelectronics; (10) mathematics; (11) physics of solids; (12) materials; (13) chemistry; (14) biological, agricultural, and medical sciences. The address by N. S. Khrushchev at the plenary session of the TsK KPSS in January is mentioned in this connection; (15) sciences concerning universe

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and earth (16) social sciences. The discussion on the report by M. V. Keldysh began at the evening session on June 12, 1961, lasted all the next day, and partly occupied the final meeting.

ASSOCIATION: Akademiya nauk SSSR (Academy of Sciences USSR)

KELDYSH, M.V., akademik

The 22d Congress of the CPSU and the tasks of the Academy of Sciences of the U.S.S.R. Vest. AN SSSR 31 no.12:7-34 D '61. (MIRA 14:12)

1. Prezident Akademii nauk SSSR.
(Russia—Economic conditions)
(Research)

KELDYSH, M.V., akademik

Historical feat. Priroda 50 no.7:3-4 Jl '61. (MIRA 14:6)

1. Prezident Akademii nauk SSSR.
(Astronautics)

KELDYSH, M. V.

KELDYSH, M.; SEDOV, L., akademik

Earth, space, earth. Nauka i zhyttia 12 no.9:2-4 S '62.
(MIRA 16:1)

1. Prezident AN SSSR (for Keldysh).
(Astronautics)

KELDYSH, M.V., akademik

New winners of Lenin prizes. Vest. AN SSSR 32 no.5:3-6 My '62. (MIRA 15:5)

1. Prezident AN SSSR, predsedatel' Komiteta po Leninskim premiyam v oblasti nauki i tekhniki.
(Lenin prizes)

KELDYSH, M.V., akademik

Recent advances in science and technology. Vest.AN SSSR 32 no.12: 9-14 D '62. (MIRA 15:12)

1. Prezident AN SSSR.
(Research)

KELDYSH, M. V., akademik

Road to space has been discovered. Av. i kosm. 45 no.9:40-41 '62. (MIRA 15:10)

1. Prezident Akademii nauk SSSR.

(Space flight)

KELDYSH, M.V., akademik

Natural science and the building of communism. Priroda 51 no.1: 17-24 Ja '62. (MIRA 15:1)

(Science)

KELDYSH, M.V., akademik

Victories of reason and labor. Priroda 51 no.9:8-10 S '62. (MIRA 15:9)

(Astronautics)

KELDYSH, M.V., akademik

Let's strengthen the alliance between naturalists and philosophers. Priroda 51 no.11:5-6 N '62. (MIRA 15:11)
(Social sciences—Congresses)
(Communism and science)

KELDYSH, M.V.

Development of cybernetics is a problem facing specialists of various fields of science. Izv. AN SSSR. otd. tekh. nauk. tekh. kib. no.3:3-4 My-Je '63. (MIRA 16:7)

(Automatic control) (Cybernetics)

POPOVICH, P.[Popovych, P.], letchik-kosmonavt SSSR; KELDYSH, M.V.

April 12th, Astronautics Day. Znan. ta pratsia no.4:12 Ap '63.
(MIRA 16:6)

1. Prezident AN SSSR (for Keldysh).
(Astronautics)

KELDYSH, M.V., akademik

Opening speech by Academician M.V.Keldysh, President of the Academy of Sciences of the U.S.S.R. Vest. AN SSSR 33 no.3: 3-10 Mr '63. (MIRA 16:3)

1. President AN SSSR.
(Academy of Sciences of the U.S.S.R.)

EWP(j)/FCS(q)/EPF(c)/EWT(m)/BDS--AFFTC/ASD--Pc-4/Pr-4--RM/WW
L 10781-63
ACCESSION NR: AP3001614 S/0030/63/000/005/0003/0006

AUTHOR: Keldy*sh, M. V. (Academician, President, Academy of Sciences SSSR) 66

TITLE: Scholar holders of the Lenin Prize for 1963

SOURCE: AN SSSR. Vestnik, no. 5, 1963, 3-8

TOPIC TAGS: Andrianov, organosilicon compound, organoelemental compound, inorganic molecular chain, hydrolytic polycondensation, linear polymer, polymer

ABSTRACT: In an article on various 1963 Lenin Prize winners, K. A. Andrianov, Corresponding Member of the Academy of Sciences SSSR, is mentioned for his "Study in the Field of Polymers with Inorganic Backbones." Other studies by Andrianov have dealt with the hydrolytic polycondensation reaction used in the industrial production of organosilicon materials, the synthesis of linear polymers with inorganic molecular chains, and the reaction mechanism and synthesis of various organoelemental polymers. He has synthesized new groups of polymers of various structures with inorganic backbones containing Si in combination with such elements as Ti, Al, B, and Sn. Polymers synthesized by Andrianov's methods are being used in the production of electric insulation materials and heat-resistant enamels, plastics, adhesives, and varnishes.

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ES(v) AFFTC/AFMDC/ESD-3/APGC/SSD Pd-4/Pf-4/Pe-4/Pg-4/Po-4/Pq-4 JD/HM

ACCESSION NR: AP3003918 S/0259/63/000/006/0001/0002

109
99

AUTHOR: Keldy*sh, M. (Chairman)

TITLE: No title. "In the creative work of our country..." (Concerns Lenin prizes for science and technology.)

SOURCE: Nauka i tekhnika, no. 6, 1963, 1-2

TOPIC TAGS: Lenin prize , science, technology

14

ABSTRACT: Lenin prizes for 1963 in science and technology include a first prize for M. S. Molodenskiy's geophysic series about the Earth. Molodenskiy has developed formulas to simplify geodetic surveying, has calculated movement of satellites, and has contributed much to the understanding of earth tides and nutation. B. M. Pontecorvo received a prize for his basic work on the weak interaction of elementary particles and on neutrino physics. I. N. Vekua was honored for his monograph "Generalized Analytical Functions" in which he develops a new method of investigating mathematical physics problems with results that can be applied to the theory of surfaces and to the mechanics of a continuum. In chemistry 3 prizes were awarded: to K. A. Andrianov

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for his "Investigation of Polymers with Inorganic Molecular Main Chains"; to D. N. Kursanov and M. Ye. Vol'pin for research in new nonbenzenoid aromatic systems; and to V. P. Zuyev, V. V. Saulina, P. A. Tesner, and others for the industrial development of carbon black from liquid hydrocarbons. In the field of medicine N. N. Petrov was honored for his 3 volume work "Malignant Tumors" and A. A. Smorodintsev and M. P. Chumakov were honored for directing the development of live polio vaccine. Awards were also given for improved gas drilling methods, automatic arc welding in a carbon dioxide protective atmosphere, a new type of furnace with ceramic panel walls, and a new type of steam turbine (200,000 kw). Orig. art. has: none.

ASSOCIATION: Komitet po Leninskim premiyam v oblasti nauki i tekhniki pri sovete ministrov SSSR (Committee for Lenin Prizes in the Fields of Science and Technology)

SUBMITTED: 00 DATE ACQ: 07Aug63 ENCL: 00

SUB CODE: AD NO REF SOV: 000 OTHER: 000

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L 11292-63 EPR/EWP(j)/EPF(c)/BDS--AFFTC/ASD--Ps-4/Pc-4/Pr-4--RM/WW

ACCESSION NR: AP3001803 S/0030/63/000/006/0003/0022 73 70

AUTHOR: Keldy*sh, M. V. (Academician, President of the Academy of Sciences SSSR)

TITLE: Measures for improving the work of the Academy of Sciences SSSR *

SOURCE: AN SSSR. Vestnik, no. 6, 1963, 3-22

TOPIC TAGS: sheet glass, corrosion-resistant material, electrical-insulating material, protective coating, rare element, pure element, polypropylene, formaldehyde, polyformaldehyde, trioxane, acetic acid, finishes, polyacrylate

ABSTRACT: In a report to the Obshcheye sobraniye Akademii nauk SSSR (General Assembly of the Academy of Sciences SSSR), the President of the Academy, M. V. Keldy*sh, stressed the following achievements in the field of nonmetallic materials: development of a method for increasing the strength of sheet glass by 5 to 10 times; development of corrosion-resistant and electrical-insulating materials; development of coatings for the protection of various materials, including high-melting metals, against corrosion at high temperatures; development of methods for the separation of rare and other elements and for the control of their purity; synthesis of organosilicon compounds; development of a method for the production of polypropylene in collaboration with the

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ACCESSION NR: AP3001803

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Moskovskiy neftepererabaty*vayushchiy zavod (Moscow Petroleum Refinery); development of a method for the production of formaldehyde by direct oxidation of methane with atmospheric oxygen; development of a new method for the production of polyformaldehyde from trioxane; improvement of the production technology of acetic acid; development of a new, nontoxic antiknock; and development of polyacrylate-based high-quality protective, finishing, and electrical-insulating coating for the radio and automobile industries. [Abstracter's note: This abstract covers only paragraphs 5 through 9 of page 6 of the original article.]

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 15Jul63 ENCL: 00

SUB CODE: MA NO REF SOV: 000 OTHER: 000

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KELDYSH, M.V., akademik; DORODNITSYN, A.A., akademik; SOBOLEV, S.L., akademik; TRAPEZNIKOV, V.A., akademik; STAROVSKIY, V.N.; KOEN, I., prof.psikhologii; BERNAL, D. (Angliya); PAUELL, S.; ARTSIMOVICH, L.A., akademik; NEMCHINOV, V.S., akademik

Science in the borderland of fantasy. Tekh.mo. 31 no.1:2 of cover, 2,7, '63. (MIRA 16:3)

1. Prezident AN SSSR (for Keldysh). 2. Chlen-korrespondent AN SSSR (for Starovskiy). 3. Manchesterskiy universitet, Angliya (for Koen). 4. Prezident Vsemirnoy federatsii nauchnykh rabotnikov (for Pauell).
(Science)

KELDYSH, M.V., akademik

All forces of science should be directed to the building up of communism. Vest. AN SSSR 33 no.7:5-9 Jl '63. (MIRA 16:8)

1. Prezident AN SSSR.

(No subject headings)

KELDYSH, M.V., akademik

Increase the role of science in the formation of communist philosophy. Vest. AN SSSR 33 no.8:6-7 Ag '63. (MIRA 16:8)

1. Prezident AN SSSR.

(Science)

KELDYSH, M.V., akademik

Outstanding successes of Soviet science. Priroda 53 no.3:5-8 '64.
(MIRA 17:4)

1. President AN SSSR.

KELDYSH, M.V., akademik

For peace and progress. Priroda 52 no.4:48-50 '63. (MIRA 16:4)

1. Prezident AN SSSR.

(Science)